## CLAIMS

- 1. A magnetizing device for superconductor, the magnetizing device being characterized by comprising:
  - (a) a superconductor;
- (b) cooling means for cooling the superconductor down to or below a critical temperature at which the transition to a superconducting state occurs;
- (c) magnetic field generating means that generates a magnetic field equal to or higher than a critical magnetic field in which the intrusion of a magnetic flux into the superconductor starts, around the superconductor cooled down to or below the critical temperature at which the transition to the superconducting state occurs; and
- (d) position modification means capable of arranging the superconductor outside a coil as an element constituting the magnetic field generating means, and modifying the relative positional relationship between the superconductor and the coil.
- 2. The magnetizing device for superconductor according to Claim 1.

wherein the position modification means is disposed on the fixed sides as the magnetic field generating means; and

wherein the superconductor can be disposed by the position modification means so as to be sandwiched between a pair of opposing coils.

- 3. The magnetizing device for superconductor according to Claim 2, wherein the superconductor is a high temperature superconductor arranged on a rotating plate.
- 4. The magnetizing device for superconductor according to Claim 2, wherein each of the pair of coils is formed as a spiral shape coil opposed to a surface of the superconductor.
- 5. A superconducting synchronous machine characterized by comprising:
  - (a) a superconductor arranged on a disk;
- (b) cooling means for cooling the superconductor down to or below a critical temperature at which the transition to a superconducting state occurs;
- (c) magnetic field generating means that generates a magnetic field equal to or higher than a critical magnetic field in which the intrusion of a magnetic flux into the superconductor starts, around the superconductor cooled down to or below the critical temperature at which the transition to the superconducting state occurs;
- (d) an alternating current power source for supplying the magnetic field generating means with a current for driving the superconductor; and
- (e) a mode changeover switch for performing a changeover between the magnetic field generation mode and an alternating current supply mode.
  - 6. A superconducting synchronous machine characterized by

## comprising:

- (a) a superconductor arranged on a disk;
- (b) cooling means for cooling the superconductor down to or below a critical temperature at which the transition to a superconducting state occurs;
- (c) magnetic field generating means that generates a magnetic field equal to or higher than a critical magnetic field in which the intrusion of a magnetic flux into the superconductor starts, around the superconductor cooled down to or below the critical temperature at which the transition to the superconducting state occurs;
- (d) a prime mover for rotationally driving the disk with the superconductor provided thereon; and
- (e) a mode changeover switch for performing a changeover between the magnetic field generation mode and a power generation mode.
- 7. A superconducting synchronous machine characterized by comprising:
  - (a) a superconductor arranged on a disk;
- (b) cooling means for cooling the superconductor down to or below a critical temperature at which the transition to a superconducting state occurs;
- (c) magnetic field generating means that generates a magnetic field equal to or higher than a critical magnetic field in which the intrusion of a magnetic flux into the

superconductor starts, around the superconductor cooled down to or below the critical temperature at which the transition to the superconducting state occurs;

- (d) an alternating current power source for supplying the magnetic field generating means with a current for driving the superconductor;
- (e) a prime mover for rotationally driving the diskwith the superconductor provided thereon; and
- (f) a mode changeover switch for performing a changeover among the magnetic field generation mode, an alternating current supply mode, and a power generation mode.
- 8. The superconducting synchronous machine according to Claim 5, 6, or 7, further comprising a sensor for detecting the strength of a magnetic field of the superconductor to thereby control the magnetization of the superconductor.
- 9. The superconducting synchronous machine according to Claim 5, 6, or 7,

wherein the magnetic field generating means is disposed on the fixed sides; and

wherein the superconductor can be disposed so as to be sandwiched between a pair of opposing armature coils.

- 10. The superconducting synchronous machine according to Claim 9, wherein each of the pair of coils is formed as a spiral shape coil opposed to a surface of the superconductor.
  - 11. The superconducting synchronous machine according to

Claim 9,

wherein the number of the pairs of armature coils is an integral multiple of three; and

wherein the number of the superconductors is an integral multiple of two.

- 12. The superconducting synchronous machine according to Claim 5, 6, or 7, wherein the superconductor is a high temperature superconductor.
- 13. The superconducting synchronous machine according to Claim 5, 6, or 7, wherein the disk is cooled down by the cooling means.